

REMARKS

Prematureness of Final Rejection

The Applicants respectfully request reconsideration of the finality of the rejections of the Office Action. In particular, M.P.E.P. 706.07(a) Rev. 2, May 2004 at pages 700-74 to 700-75 states that

“a second or any subsequent action on the merits in any application or patent undergoing reexamination proceedings will not be made final if it includes a rejection, on newly cited art, other than information submitted in an information disclosure statement filed under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17 (p), of any claim not amended by applicant or patent owner in spite of the fact that other claims may have been amended to require newly cited art.”

In the present application, Applicants did not become aware of WO 89/12107 until reviewing an excerpt from U.S. Patent No. 5,207,826 to Westland *et al.* that was cited by the Examiner in the Office Action of November 7, 2003. The Applicants thereafter submitted WO 89/12107 on Form PTO-1449 with the Amendment dated February 6, 2004. This was within three months of Applicants’ learning of WO 89/12107. At page 10, lines 1-6 of the Amendment dated February 6, 2004, it was stated that “Applicant was not aware of WO 89/12107 until Westland was cited in the Office Action.” Thus, Applicants were not required to pay the fee set forth in 37 CFR 1.17 (p) and did not do so.

In the present Office Action, claim 12, which was never amended before this amendment, was rejected using WO 89/12107. Accordingly, the Applicants respectfully submit that the guidance of M.P.E.P. 706.07(a) quoted above applies. Specifically, the present Office Action should not be made final as it includes a rejection, on newly cited art, other than information submitted in an information disclosure statement filed under

37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17 (p), of a claim (i.e., claim 12) not amended by applicants.

Thus, the Applicants respectfully request favorable reconsideration of the finality of the rejections of the present Office Action.

Claim Amendments

Claims 1-11 and 17-20 have been cancelled without prejudice to the filing of divisional applications.

Independent claim 12 has been amended to recite a metal catalyst in or on the electrode support structure wherein the metal catalyst is disposed in or on the electrode support structure by placing the electrode support structure in a solution of a metal salt for a sufficient time period such that the metal salt is reduced to metallic form and the metal catalyst precipitates in or on the electrode support structure. This new limitation has a basis at page 10, lines 24-27 of the specification.

Claim 21 has been amended in view of the amendment to claim 12, and this amendment has a basis at page 11, lines 3-4 of the specification.

New claim 24 has been added to provide an example of the metal salt limitation added to independent claim 12. The features of claim 24 have a basis at page 10, lines 27-30 of the specification.

35 U.S.C. §103(a) Rejections

Claims 12-14, 16 and 21-23 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,087,032 to Yoshitake *et al.* ("Yoshitake") in view of WO 89/12107 to Brown ("WO '107"). Claim 15 was rejected under 35 U.S.C.

§103(a) as being unpatentable over Yoshitake" and WO '107 in view of U.S. Patent No. 5,207,826 to Westland *et al.* ("Westland").

Yoshitake was cited as disclosing a fuel cell comprising an electrolyte membrane, a fuel electrode and an air electrode. The Office Action concedes that Yoshitake does not disclose specific anode or cathode material.

In WO '107, some uses of bacterial cellulose are broadly described, and WO '107 does mention "a specialty carrier, such as for battery fluid and fuel cells" at page 3, lines 32-33. WO '107 also mentions "materials having special electronic effects produced by coating the individual microbial-produced, cellulose, microfibrils with appropriate components, such as metals by vapor deposition or epitaxial growth" (see page 3, line 34 to page 4, line 2 of WO '107), and also describes the vaporizing of platinum on cellulose films at page 26, lines 14-17.

Westland was cited in the Office Action as teaching that a base medium for bacterial cellulose may comprise metal salts and that bacterial cellulose can be coated with metals. However, Westland says nothing about the deposition of the metal from metal salts.

There are fundamental differences between the invention of amended independent claim 12 and the teachings of Yoshitake, WO '107, and Westland. The methods used by Yoshitake, WO '107 and Westland for the incorporation of metal particles can employ one of two processes: (1) preformed metal particles that are then entrapped in the cellulose matrix during a sheet casting process; or (2) metal particles that deposited or epitaxially grown on the surfaces of the cellulose by vaporization of a metal.

In amended independent claim 12, the deposition of metal catalyst particles is from the corresponding metal salt (e.g., hexachloropalladate) in solution that is infused into the natural cellulose structure. Particle formation is then initiated by reduction of the metal salts (e.g., hexachloropalladate) by the reducing ends of the cellulose chains. Cellulose is a polymer of glucose, and the reducing ends have free aldehyde groups as does glucose in solution. An alternative method is the infusion of another chemical that can reduce the metal salts inside the cellulose matrix. The inventors have tunneling electron microscopy images of the palladium particles formed by this method that show size (5-20 nm) and crystallinity of the palladium particles. See attached Figs. 4 and 5.

The method for disposing the catalyst on the electrode as in amended independent claim 12 has advantages over prior art vapor deposition methods. For example, the metal catalyst loading in or on the electrode support structure can be readily varied by controlling the amount of metal salt and the incubation time. Also, the co-precipitation of different metals can be achieved. See page 10, lines 29-32 of the specification. Furthermore, vapor deposition methods do not provide for effective deposition of metal in the internal pores of the electrode as in the present invention. In contrast, the claimed invention allows for infusion of the metal salt into the pores of the cellulose. Thus, the product of claim 12 is distinguishable from the product that would be created using the teachings of Yoshitake, WO '107, and Westland.

In summary, (1) Yoshitake does not disclose the use of bacterial cellulose in an electrolyte membrane or a fuel cell anode or a fuel cell cathode as recited in amended claim 12; and (2) Westland and WO 89/12107 do not describe precipitation of a metal catalyst on cellulose as specifically recited in amended claim 12. Thus, all of the

limitations of amended independent claim 12 (and claims 13-16 and 21-23 that depend thereon) are not taught in any combination of Yoshitake, Westland and WO 89/12107.

Conclusion

It is submitted that the entire application has been placed in condition for allowance. Favorable reconsideration is respectfully requested. No fees are believed to be needed for this amendment. If fees are needed, please charge them to Deposit Account 17-0055.

Respectfully submitted,

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